

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
RESEARCH AND TECHNOLOGY RESUME

TITLE

Imaging Studies of Comets

PERFORMING ORGANIZATION

Laboratory for Astronomy and Solar Physics
Goddard Space Flight Center
Greenbelt, MD 20771

INVESTIGATOR'S NAME

Malcolm B. Niedner, Jr.

TEL. NO.

(301) 286-5821

DESCRIPTION (a. Brief statement on strategy of investigation; b. Progress and accomplishments of prior year; c. What will be accomplished this year, as well as how and why; and d. Summary bibliography)

a.) The Joint Observatory for Cometary Research (JOCR) is jointly run by NASA-GSFC and the New Mexico Institute of Mining and Technology. JOCR emphasizes imaging observations of cometary plasma on the large and small scale, from which data it is hoped that an increased understanding of the comet/solar-wind-IMF interaction will emerge. JOCR is located under dark skies on South Baldy mountain (el. 10,600 feet) near Socorro, NM, and is one of the last truly dark sites in the continental U.S. The principal instrument is a 14-inch "Comet Schmidt" which records an $8^{\circ} \times 10^{\circ}$ field onto 4"x5" plates. A 16" Newtonian/Cass. also exists on site and is presently operational with a CCD detector for filtered observations of the near-nuclear region of comets. JOCR imagery of bright comets since 1973 has resulted in several important published findings concerning cometary plasma structure and solar-wind interactions.

b.) Schmidt camera plates of comet Bradfield were secured on several nights in October 1987. The images of October 20 show the development of a huge bend in the plasma tail travelling several hundred kilometers per second down the tail; the likely solar-wind origin of this event is being explored at the present time. A CCD detector has been successfully installed on the 16" telescope and several non-cometary images have been obtained. Calibration of the CCD is still underway, but high-quality, filtered cometary images should be possible in the near future.

c.) Plans include obtaining CCD photometry of stars along Halley's path for determining Halley's variable ion production rate--apparent in the wide-field Schmidt images--at times of disconnection events; and further development of the 16" Newtonian/Cass. instrument for the post-Halley era, including the purchase of a spectrograph for the CCD and an offset guider. For the Schmidt, we plan to purchase new slow motion paddles and a sensitometer so that plates calibrated for relative intensity can be obtained of future bright comets. **The analysis of the 1987 comet Bradfield plasma-tail transient will continue.**

d.) "Plasma-Tail Activity at the time of the VEGA Encounters", M. B. Niedner and K. Schwingenschuh, Astron. Astrophys., 187, 103-108 (1987).

"A Solar-Wind-Induced Extreme Tail Deformation in Comet Bradfield 1987", D. A. Klinglesmith, M. B. Niedner, and S. N. Shore, B. A. A. S. (Abstract) 1988.

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